IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: NEAL et al.	Attorney Docket No.: DEM1P008
Application No.: 10/006,608	Examiner: HEWITT II, Calvin L.
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Title: SUBSET OPTIMIZATION SYSTEM	Confirmation No: 1143

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APPEAL BRIEF UNDER 37 C.F.R. 41.37

Further to Notice of Appeal filed in this application on April 24, 2008 and the Notice of Panel Decision from Pre-Appeal Brief Review dated June 24, 2008, this Appeal Brief is being submitted to the Board of Patent Appeals and Interferences.

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Dear Sirs:

Appellants hereby appeal the decision of the primary examiner mailed December 27, 2007. The Appeal Board is thanked for their review of the application.

I.   REAL PARTY IN INTEREST

The real party in interest is DemandTec Corporation, a corporation of the state of Delaware, the assignee of all rights, title and interest in the present application from applicants Michael Neal, Krishna Venkatraman, Rob Parkin, Suzanne Valentine, Phil Delurgio, and Hau Lee recorded in the United States Patent and Trademark Office on reel/frame 012690/0496.

II.   RELATED APPEALS AND INTERFERENCES

Based upon information and belief, there are no appeals or interferences that could directly affect or be directly affected by or have a bearing on the decision by the Board of Patent Appeals and Interferences in the pending appeal.

III.   STATUS OF THE CLAIMS

The final rejection of Claims 1, 3-7, 9-14 and 16-28 are being appealed. These appealed claims are reproduced in the Claims Appendix hereto. Original claims 1, 3-7, 9-14 and 16-28 remain in the present application. Status of the claims is as follows:

a) Claims 1, 3-7, 9-14 and 16-28 have been rejected.

b) Claims 2, 8 and 15 been previously cancelled.

c) All rejected Claims 1, 3-7, 9-14 and 16-28 are being appealed.

IV.   STATUS OF THE AMENDMENTS

No amendment has been filed since the mailing on December 27, 2007 of the final Office Action herein.

V.   SUMMARY OF THE CLAIMED SUBJECT MATTER

The appealed independent Claims 1, 14 and 21-24 include a common concept, although expressed in different ways and scope. In setting prices for products in a typical business, proper pricing of goods and services is integral to the success of the business. As such, pricing systems, including price optimization systems, are highly valued by businesses and fulfill an important role in business decision making and planning.

Product pricing may be performed by a manager, or by a sophisticated pricing system. Such systems may set prices according to competitors' prices, industry standards or pricing rules. In some instances, pricing may be determined as an optimization process which utilizes complicated models to maximize an objective. This objective is often to maximize profit for the business; however, other objectives are also often pursued, including maximizing revenue, target volume sales and market share increase.

While pricing optimizations are a highly effective way of setting retail prices, there are inherent drawbacks associated with such optimizations. The first of these drawbacks is that pricing optimizations, which involve cross elastic demand models, are extremely computationally intensive. This is further compounded as the number of products optimized for increases.

The second drawback to traditional optimizations is that the logistical costs associated with physically replacing and updating product pricing is very large for major retailers. As such, these retailers are less prone to undergo pricing optimizations on a regular and frequent basis.

The present invention addresses these drawbacks by disclosing systems and methods for setting prices for a subset of products. (page 4, lines 15-20). The invention models demand for

products, generates a subset of products from the plurality of products and then optimizes the prices for the products in the subset. (page 133, line 1 to page 135, line 15). The optimization is performed to optimize prices for some goal; be it profit maximization, market share dominance or volume goals. (page 3, lines 1-3).

      <u>This invention is unique in that specific subsets of products are selected such that the price setting has the largest impact on the objective of any possible subset of products.</u> (page 134, lines 9-19; page 136, line 5 to page 141, line 13). Subset selection involves the generation of a set of candidate products. (page 136, lines 5-11). Candidate products are those that have had changes in information state or are not constrained. (page 136, lines 12-23; page 138, lines 8-15).

      Next, the invention designates a number (i.e. 'N'), which is the maximum number of products that may populate the subset. (page 140, lines 21-24). A mixed integer problem is solved for the subset population where the maximum marginal value to the objective of each product's price is determined. (page 134, lines 9-16; page 140, lines 1-6). As such, the subset is populated by products that have the largest impact on the client's objective function. (page 134, lines 9-16).

      Thus, the invention is capable of generating product pricing updates for a store that require relatively few prices to be changed, and yet having a significant impact upon the retailer bottom line. (page 150, lines 4-9; page 134, lines 9-13).

      The benefit of generating the product pricing in this fashion is that the invention greatly reduces the logistical costs associated with implementing storewide price changes. Thus, retail stores may perform more frequent, smaller, and still effective product price changes. This may, ultimately, result in more successful businesses.

      No other system selects a subset of products for pricing optimization as in the present invention. As such, the present invention provides a dramatic improvement over prior price setting systems.

A. Regarding Independent Claim 1

Claim 1 of this application addresses an apparatus for setting prices for a subset of products. (page 4, lines 15-20). In particular, Claim 1 states "An apparatus for implementing a preferred set of prices for a subset of a plurality of products, comprising computer readable media, comprising: a database configured to store initial prices for a plurality of products; **a modeling engine** configured to **create a demand model** for the plurality of products **based on Bayesian modeling; a subset generator configured to designate a subset of products** of the plurality of products, wherein the number of products in the subset of products is less than the number of products in the plurality of products, the subset being designated by solving an integer problem, and wherein the subset generator is also configured to enable a number N to be designated and the subset generator is also configured to **select no more than N products** of the plurality of products to form the subset of products, and wherein the selected no more than N products **has the largest impact on optimization of prices of any subset of no more than N products** of the plurality of products; **an optimizer configured to optimize prices for products in the subset of products**, using the created demand model, while maintaining the initial prices of products of the plurality of products that are not in the subset of products, wherein **the optimization includes relaxation of constraints**; and **an interface** configured **to report the optimized prices** of the subset of products **for price setting**, wherein the price setting establishes the amount of money consumers pay for each product of the subset of product." (Emphasis Added). (page 133, line 1 to page 150, line 15).

B. Regarding Independent Claim 14

The appealed independent Claim 14 discloses a first method for the pricing of products. (page 2, lines 18-20; page 4, lines 15-20). In particular, Claim 14 states "A computer-implemented method for computing a preferred set of prices for a subset of products of a plurality of products, comprising: storing initial prices for a plurality of products; **creating a demand model based on Bayesian modeling; designating a subset of products** of the plurality

of products, wherein the number of products in the subset of products is less than the number of products in the plurality of products, the designating a subset of products comprising: generating a set of candidate products of the plurality of products; designating a number N; **determining which N products of the candidate products have the largest impact on optimization of prices by solving an integer problem**; and selecting no more than N products of the plurality of products to form the subset of products using the determination of which N products have the largest impact on optimization; **optimizing prices for products in the subset of products** using the demand model, while maintaining the initial prices of products of the plurality of products that are not in the subset of products using the demand model, wherein the optimization includes a relaxation of constraints; and **reporting the optimized prices** of the subset of products for price setting, wherein the price setting establishes the amount of money consumers pay for each product of the subset of product." (Emphasis Added). (page 133, line 1 to page 150, line 15).

C. Regarding Independent Claim 21

The appealed independent Claim 21 discloses a second method for the pricing of products. (page 2, lines 18-20; page 4, lines 15-20). In particular, Claim 21 states "A computer-implemented method for setting prices for a subset of products of a plurality of products, comprising: **receiving optimized prices** for a product category; pricing every item in the product category according to the received optimized prices; providing new data; **receiving new prices for the subset of products of the product category**, wherein the subset is smaller than the product category, wherein the received new prices are generated by storing initial prices for a plurality of products, designating a subset of products of the plurality of products, wherein the number of products in the subset of products is less than the number of products in the plurality of products, the subset being designated by solving an integer problem, and wherein the designation of the subset of products includes allowing a number N to be designated and **selecting no more than N products of the plurality of products to form the subset of products, and wherein the selected no more than N products has the largest impact on**

optimization of prices of any subset of no more than N products of the plurality of products; optimizing prices for products in the subset of products, while freezing the initial prices of products of the plurality of products in the product category that are not in the subset of products, wherein the optimization includes relaxation of constraints; and setting prices for the subset of products according to the received new prices, wherein the price setting establishes the amount of money consumers pay for each product of the subset of product." (Emphasis Added). (page 133, line 1 to page 150, line 15).

D. Regarding Independent Claim 22

The appealed independent Claim 22 discloses a method embodied in a data signal for the pricing of products. (page 2, lines 18-20; page 4, lines 15-20). In particular, Claim 22 states "A computer-implemented data signal embodied in a carrier wave and representing sequences of instructions which when executed by a processor, causes the processor to compute a preferred set of prices for a subset of a plurality of products, by performing the steps comprising: storing initial prices for a plurality of products; **designating a subset of products** of the plurality of products, wherein the number of products in the subset of products is less than the number of products in the plurality of products, **the subset being designated by solving an integer problem**, and wherein the designation of the subset of products includes allowing a number N to be designated and **selecting no more than N products** of the plurality of products to form the subset of products, and **wherein the selected no more than N products has the largest impact on optimization of prices of any subset** of no more than N products of the plurality of products; optimizing prices for products in the subset of products, while maintaining the initial prices of products of the plurality of products that are not in the subset of products, wherein the optimization includes relaxation of constraints; displaying optimized prices for products in the subset of products; and setting store prices for products in the subset of products to optimized prices for products in the subset of products." (Emphasis Added). (page 133, line 1 to page 150, line 15).

E. Regarding Independent Claim 23

The appealed independent Claim 23 discloses a database utilized for the pricing of products. (page 2, lines 18-20; page 4, lines 15-20). In particular, Claim 23 states "A computer-implemented price database generated by the method comprising: storing initial prices for a plurality of products; **designating a subset of products** of the plurality of products, wherein the number of products in the subset of products is less than the number of products in the plurality of products, the subset being designated **by solving an integer problem**, and wherein the designation of the subset of products includes allowing a number N to be designated and **selecting no more than N products** of the plurality of products to form the subset of products, and **wherein the selected no more than N products has the largest impact on optimization of prices of any subset** of no more than N products of the plurality of products; optimizing prices for products in the subset of products, while maintaining the initial prices of products of the plurality of products that are not in the subset of products, wherein the optimization includes relaxation of constraints; and reporting the optimized prices of the subset of products for price setting, wherein the price setting establishes the amount of money consumers pay for each product of the subset of product." (Emphasis Added). (page 133, line 1 to page 150, line 15).

F. Regarding Independent Claim 24

The appealed independent Claim 24 discloses a method for obtaining pricing data. (page 2, lines 18-20; page 4, lines 15-20). In particular, Claim 24 states "A computer-implemented method for obtaining optimized price data on a client system, comprising the steps of: sending sales data to a server system for a plurality of products; selecting optimization preferences; transmitting said optimization preferences to said server system; receiving from said server system optimization prices for all of the plurality of products, wherein the optimization includes relaxation of constraints; sending additional sales data to the server system; selecting a subset constraint; sending the subset constraint to the server system; **receiving from the server system a new set of optimization prices for a subset of the plurality of products** which is less than

the plurality of products, **the subset being designated by solving an integer problem**, wherein the optimization includes relaxation of constraints, and wherein the designation of the subset of products includes allowing a number N to be designated and **selecting no more than N products** of the plurality of products to form the subset of products, and **wherein the selected no more than N products has the largest impact on optimization of prices of any subset** of no more than N products of the plurality of products; and setting prices for the subset of products according to the received new prices, wherein the price setting establishes the amount of money consumers pay for each product of the subset of product." (Emphasis Added). (page 133, line 1 to page 150, line 15).

G. Regarding Dependent Claims 3-7, 9-13, 16-20, and 25-28

Claims 3 and 16 state "wherein the [] select no more than N products selects products that **have had a change in information state, and** products of the plurality of products that **have constraints enabling price movement**." (Emphasis Added). (page 136, lines 6-11).

Claims 4, 9 and 17 add that the invention further comprises "computer readable code for providing initial prices by optimizing prices for all of the plurality of products." (page 133, lines 8-13).

Claims 5, 10 and 18 clarify by stating the invention further comprises "providing new data subsequent to providing initial prices by optimizing prices." (page 133, lines 13-19).

Claims 6, 11 and 19 further clarify by stating "wherein the [] new data comprises computer readable code for providing new price data and computer readable code for providing new bound data." (page 135, lines 5-8; page 138, lines 5-11).

Claim 9 clarifies by stating apparatus further comprises "computer readable code for providing rule relaxation." (page 123, line 3 to page 129, line 3).

Claims 7, 13 and 20 clarify by stating the invention further comprises "providing rule relaxation, wherein the [] rule relaxation comprises: [prioritizing] a plurality of rules; and []

relaxing at least one lower priority rule to allow a higher priority rule to become feasible." (page 126, line 5 to page 128, line 3).

Claim 25 states "wherein the integer problem is based on an objective function which includes a sum of a plurality of marginal product price values." (page 134, line 13-16; page 128, lines 1-10).

Claims 26 and 27 state that the invention further comprises "resolving errors of new data provided, utilizing a grid of time periods including records, comprising: [] removing duplicate records of the new data; [] removing the records for discontinued products, wherein the plurality of products includes discontinued products; [] removing the records that include at least one of negative prices, negative sale volume, negative costs, and erroneous prices, wherein the erroneous prices includes a product price that is a specified configurable standard deviations from mean price of the product of the plurality of products; [] removing the new data from closed stores, wherein the closed stores are determined by a lack of product movement at the closed store for a set time period; [] removing missing records, of the records, in the grid of time periods' first and last row; and [] generating replacement records for missing records, of the records, in the grid of time periods."

Lastly, Claim 28 states "wherein the largest impact on optimization of prices maximizes an objective factor, wherein the objective factor includes at least one of maximizing profits, and maximizing sales of a product of the plurality of products." (page 3, lines 1-3).

Appellants assert that all pending Claims 1, 3-7, 9-14 and 16-28 are novel and non-obvious over the cited art for all the reasons given below.

VI.   GROUNDS OF REJECTION TO REVIEWED ON APPEAL

The Board is being asked to review the final rejection of Claims 1, 3-7, 9-14 and 16-28 under 35 U.S.C. §112, under 35 U.S.C. §101, and under 35 U.S.C. §103 as being unpatentable over Ouimet et al. (US 6,094,641), in view of Hartman et al., (US 5,987,425), and further in view of Delurgio et al. (US 6,553,352).

VII.   REMARKS/ARGUMENTS

Appellants thank the Appeal Board for the review of this Appeal Brief. Appellants will now address the patentability of the present invention, with particular attention paid to the rejections made by the Examiner in response to the Amendment dated October 4, 2007, which is hereby incorporated by reference.

For the sake of clarity, Appellants have divided the arguments into various subsections; however, this is not intended to be limiting of the arguments contained therein. Thus, arguments in one subsection may be applied to all applicable subsections.

A. RESPONSE TO REJECTION OF THE CLAIMS UNDER 35 USC §101

The Examiner rejected claims 1, 3-7, 9-14 and 16-28 under 35 U.S.C. §101 as being directed to non-statutory subject matter. Appellants believe that there is no basis for such rejections; and, as such, outline arguments below as to the allowability of the claims.

1. Regarding Claims 1 and 23

Regarding Claims 1 and 23, the examiner stated that they "read[] on storing **non-functional descriptive material** such as a program listing or pseudo code on a floppy or optical disk (i.e., computer readable median comprising ... ") (MPEP 2106.01)"

Appellants believe that the Examiner may have mischaracterized Claims 1 and 23. Citing the MPEP section 2106, "a claimed invention may be a combination of devices that appear to be directed to a machine and one or more steps of the functions performed by the machine. Such instances of mixed attributes, although potentially confusing as to which category of patentable subject matter the claim belongs, does not affect the analysis to be performed by USPTO personnel. Note that **an apparatus claim with process steps** is not classified as a 'hybrid' claim; instead, it **is simply an apparatus claim including functional limitations**. See, e.g., *R.A.C.C. Indus. v. Stun-Tech, Inc.*, 178 F.3d 1309 (Fed. Cir. 1998) (unpublished)." (Emphasis Added).

Appellants assert that Claim 1 clearly recites an apparatus with structural limitations (i.e., modeling engine, subset generator, optimizer and interface). Such an apparatus clearly falls within the enumerated category of a "machine". (See, MPEP 2106). As such, Appellants believe the rejection of Claim 1 under 35 USC §101 is erroneous and unfounded.

Likewise, Claim 23 clearly provides a method of generating a price database. Such a method clearly falls within the enumerated category of a "process". (See, MPEP 2106). As such, Appellants believe the rejection of Claim 23 under 35 USC §101 is erroneous and unfounded.

Argumentum, even if one were to take the position that the subject matter within Claims 1 and 23 did fall under "descriptive subject matter", Appellants believe, contrary to the Examiner's perspective, that base Claims 1 and 23 disclose "functional descriptive material" as they are "data structures and computer programs **which impart functionality when employed as a computer component**." (MPEP 2106.01). (Emphasis Added).

Regarding this kind of functional descriptive material, "a claimed computer-readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory." (MPEP 2106.01 subsection I). Thus, "[w]hen a computer program is recited in conjunction with a physical

structure, such as a computer memory, USPTO personnel should treat the claim as a product claim." (MPEP 2106.01 subsection I).

Hence, Appellants believe that Claims 1 and 23 recites statutory subject matter, and thus the rejections under 35 USC §101 are improper for at least one of the above reasons.

2. Regarding Claims 14, 21, 23 and 24

Regarding Claims 14, 21, 23 and 24, the Examiner stated that they are "rejected as each is directed to an algorithm. For example, Claims 14 and 23 are directed to 'optimizing prices' while 'holding' initial prices constant. This merely describes a step in a calculation. Therefore, as the claimed algorithm has not been used to produce a useful, concrete and tangible result *(AT& T Corp. v. Excel Communications, Inc., 50* USPQ2d 1447 (Fed. Cir.1999); *State Street Bank & Trust Co. v. Signature Financial Group Inc.*, 47 USPQ2d 1596 (Fed. Cir. 1998)) it is non-statutory."

Appellants assert that the claims as currently stated do not simply disclose an algorithm since all base claims produce useful, concrete and tangible results. The claims include the 'setting of prices', and the 'reporting of optimized pricing for price setting'. (Emphasis Added). Setting prices, as stated in all base Claims 1, 14, 21, 23 and 24, "establishes the amount of money consumers pay for each product of the subset of product." (Emphasis Added).

Optimal price setting is integral to the success of businesses, thereby fulfilling usefulness. Prices actually change for consumers, thus there is a tangible element to the price setting. Likewise, the price setting is non-arbitrary, as it is designed to maximize profit or another objective. Therefore, price setting is also concrete. Thus, price setting, and the reporting of, clearly produces a concrete, tangible and useful result. As such, Appellants believe the rejection of Base Claims 1, 14, 21, 23 and 24 under 35 USC §101 is unfounded and erroneous.

B. RESPONSE TO REJECTION OF THE CLAIMS UNDER 35 USC §112

The examiner rejected Claims 1, 3-7, 9-13, 26, 27 and 28 under 35 USC §112 second paragraph, stating that claims are "indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention". In particular, the Examiner appeared to be concerned that "Claim 1 is directed to an apparatus. However, claim 1 lacks 'structure'. Therefore, the scope of Applicant's claimed apparatus is unclear to one of ordinary skill (*In re Zletz*, 13 USPQ2d 1320 (Fed. Cir. 1989)."

Appellants believe that there is no basis for such rejections. Claim 1 as currently stated, includes an apparatus claim with the necessary structural components; that being the database, modeling engine, subset generator, optimizer and interface.

As such, Appellants believe the rejections under 35 USC §112 are unfounded and erroneous. However, Appellants believe a pragmatic and reasonable amending of the claims would be acceptable should the Appeal Board believe it would aid in alleviate concerns under 35 USC §112.

On a separate note, Appellants are somewhat confused as to the citation provided by the examiner in that *In re Zletz*, 13 USPQ2d 1320 (Fed. Cir. 1989) appears to be unrelated to the argument presented (i.e., claim structure). Instead, *In re Zletz* appears to merely discuss claim interpretation by stating that "during patent examination the pending claims must be interpreted as broadly as their terms reasonably allow. When the applicant states the meaning that the claim terms are intended to have, the claims are examined with that meaning, in order to achieve a complete exploration of the applicant's invention and its relation to the prior art." *In re Zletz* does not appear to discuss the <u>structure of claims</u>, nor <u>the standards of claim structure required to inform one of ordinary skill</u>. As such, Appellants believe the Examiner's perspective as to the definiteness of Claims 1, 3-7, 9-13, 26, 27 and 28 is a mere conclusion statement.

C. RESPONSE TO REJECTION OF THE CLAIMS UNDER 35 USC §103

The examiner has additionally rejected all pending Claims 1, 3-7, 9-14, 16-27 and 28 under 35 U.S.C. § 103(a) as being unpatentable over Ouimet et al. (US 6,094,641), in view of Hartman et al., (US 5,987,425), and further in view of Delurgio et al. (US 6,553,352).

Appellants believe that the present invention is nonobvious over Ouimet et al., Hartman et al. and Delurgio et al. because the cited references neither teach nor suggest each and every element of Claims 1, 14, or 21-24.

"A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *Graham v. John Deere Co.,* 383 U.S. 1, 13 (1966). Further, "[t]o establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." *In re Royka,* 490 F.2d 981 (C.C.P.A. 1974); MPEP 2143.03.

Appellants believe that there is no basis for an obviousness rejection. In response to this rejection, Appellants will provide a brief discussion of the prior art and discuss the specific rejections of related claims below.

1. DISCUSSION OF THE CITED PRIOR ART

The main reference relied upon by the Examiner in the rejection of the present invention is Ouimet et al. Ouimet et al. discloses "[a] method for incorporating psychological effects into a demand model" by selecting a model, tuning the model, optimizing and outputting the results of optimization. (See Abstract; see also Figure 3 and accompanying text at Column 3, line 43 to Column 4, line 24).

The primary focus of Ouimet et al. appears to be the inclusion of psychological factors such as how prices are perceived and product visibility. (Column 3, lines 1-12). In Ouimet et al., a demand model is selected, a pricing perception model is selected, and a visibility model is

selected. (Column 4, lines 35-66). The demand model is then tuned by multiplying the original demand model by the pricing perception model, and visibility model. (Column 5, lines 14-21).

However, **Ouimet et al. fails to disclose any mention of <u>subset generation</u>**. Nor does Ouimet et al. discuss **optimization of a subset** of products. Furthermore, Ouimet et al. appears to not include any teaching, suggestion or even contemplation of product <u>subsets for optimization</u> or any other purpose.

Hartman et al. discusses the generation of "retail prices based on customer price sensitivity." (See Abstract). However, unlike Ouimet et al., Hartman et al. discloses a system which teaches away from pricing optimization in favor of "[a] radically different approach [] where the basic philosophy is that retail prices need to be close to a vague undefined target." (Column 2, lines 55-59).

In Hartman et al. "**dealers** first review their entire inventory and **assign the SKUs to pools which indicate the dealer's feel as to the degree of the customers' sensitivity** to retail prices." (Emphasis Added). (Column 2, lines 61-63). Variable pricing theory is then utilized to assign prices to the products dependent upon price sensitivity. (Column 6, lines 13-25).

The pooling of products in Hartman et al. is **performed by a dealer, not the system** itself. (See Base Claims 1, 3, 9 and 16). Moreover, the pooling of products is performed based upon dealer's feeling **of consumer pricing sensitivity**. (Column 4, line 35 to Column 5, line 25). Then, all pools have their price set, but in a way that is at odds with price optimization. (Column 8, lines 58-64).

Thus, Hartman et al. does not appear to disclose the **generation of a subset as claimed**. Moreover, Hartman et al. does not disclose the **optimization of prices**. As such, Hartman et al. clearly fails to disclose **optimization of the subset while holding all other products' prices constant**, as claimed.

Delurgio et al. provides an interface for a user to determine the optimum prices for products. (See Abstract).

2. REGARDING THE COMBINATION OF CITED ART

Appellants assert that there is insufficient evidence of record of a motivation to combine Ouimet et al., Hartman et al. and Delurgio et al. in a manner meeting the invention as recited in Claims 1, 14, or 21-24.

"Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1734, 82 USPQ2d 1385, 1391 (2007). In *KSR*, the Supreme Court emphasized that "the principles laid down in *Graham* reaffirmed the 'functional approach' of *Hotchkiss*, 11 How. 248." *KSR*, 127 S.Ct. at 1739, 82 USPQ2d at 1395 (citing *Graham*, 383 U.S. at 12, 148 USPQ at 464). The operative question in this "functional approach" is thus "whether the improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 1740, 82 USPQ2d at 1396. The Court noted that "[t]o facilitate review, this analysis should be made explicit." *Id.*, citing *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be **some articulated reasoning** with some rational underpinning to support the legal conclusion of obviousness") (Emphasis Added).

None of the cited art disclose all of the limitations of Claims 1, 14, or 21-24. Furthermore, even if one were to construe the disclosures of the cited art to disclose said limitations, there is no disclosure of a motivation to combine in a manner which gives the functionality of the instant invention. None of the price setting disclosed in the cited art functions in such a way as to generate a subset of products and optimize for only said subset. As such, any asserted combination fails to meet the 'functionality test' outlined in *KSR, supra*.

Moreover, not only do Appellants argue that there is no motivation for combining the cited references, Appellants believe that Hartman et al. is not combinable as a matter of art with

Ouimet et al. Appellants believe that the methodology of **Hartman** et al. **is simply incompatible with Ouimet** et al.

The method disclosed in Ouimet et al. appears to be a system for further tuning a demand model by taking into account "psychological effects". (Column 3, lines 1-3). The "modified demand model from the Tuning Process [is utilized] to determine **the** price for each item that will **maximize profits.**" (Column 5, lines 45-50). (Emphasis added). As such, Ouimet et al. appears to **necessitate** computing **specific, singular output values: the price for each item that maximizes profits**.

In contrast, Hartman et al. teaches away from Ouimet et al. by disclosing a method for developing "**variable margin pricing** of products" rather than a specific value (Column 1, lines 6-10). In Hartman et al. a "**radically different approach** has been taken . . . where the basic philosophy is that **retail prices only need to be close to a vague undefined target.**" (Column 2, lines 56-60) (Emphasis Added). Further, Hartman et al. states that "there is no such thing as a correct retail price." (Column 4, lines 41-43). Hartman et al. **self proclaims its "radical[]" distinctiveness** in no uncertain terms. (Emphasis Added).

As such, Hartman et al's **methodology appears to be at complete odds to the method of Ouimet** et al. With such a fundamental difference of methodology, it is clear that the methods disclosed by Hartman et al., and that of Ouimet et al., are incompatible methods and thus, at the least, their combinability is non-obvious.

3. REGARDING CLAIMS 1, 3-7, 9-13, 26 AND 28

Claims 1, 3-7, 9-13, 26 and 28 have been rejected by the Examiner in light of Ouimet et al. (US 6,094,641). Appellants believe this rejection is erroneous and unfounded. Below is a listing of arguments where Ouimet et al. is contrasted with the claimed invention. It will become clear that Ouimet et al. does not make the present invention obvious in that they differ greatly in regard to scope, breadth, thrust and means of accomplishing their respective objectives.

i. Ouimet et al. Fails to Suggest Generating Subsets

Claim 1 of the present invention includes a "subset generator" to select a subset of the plurality of products for optimization. The subset generator selects products by determining a maximum number of items to populate the subset (N) and solving an integer problem for those products which would best further a particular business goal. See Claim 1.

Appellants assert that Ouimet et al. does not teach or suggest the generation of a subset of products, as claimed, in any way. Not only is there no description of selecting a subset of products by the products' marginal contribution to a business objective, Ouimet et al. does not appear to suggest the "subset generator" of Claim 1 at all.

As such, Claim 1 is believed allowable over the cited art. Dependent Claims 3-7, 9-13, 26 and 28, as depending from an allowable parent claim, are also allowable for at least the same reasons.

ii. Ouimet et al. Fails to Suggest Subset Optimization

The Examiner rejected Claims 1, 3-7, 9-13, 26 and 28 stating "Ouimet et al. teach an apparatus comprising a computer readable media that can be used for calculating a preferred set of prices for a plurality of products or a subset of said plurality (figure 2)."

Appellants respectfully disagree with the Examiner's statement. As discussed above, Ouimet et al. does not disclose a subset generator for creating a subset of products. The logical extension is that Ouimet et al., not having the means or suggestion of a subset, would, likewise, not have the means or suggestion of optimizing for such a subset.

As such, Claim 1 is believed allowable over the cited art. Dependent Claims 3-7, 9-13, 26 and 28, as depending from an allowable parent claim, are also allowable for at least the same reasons.

4. REGARDING CLAIMS 14 AND 16-27

Claims 14 and 16-27 have been rejected by the examiner in light of Ouimet et al. (US 6,094,641), in view of Hartman et al., (US 5,987,425), and further in view of Delurgio et al. (US 6,553,352). Appellants believe this rejection is erroneous and unfounded. Below is a listing of arguments where Ouimet et al., Hartman et al. and Delurgio et al. are contrasted with the claimed invention. It will become clear that Ouimet et al., Hartman et al. and Delurgio et al. do not make the present invention obvious in that they differ greatly in regard to scope, breadth, thrust and means of accomplishing their respective objectives.

i. Hartman et al. Fails to Suggest Generating Product Subsets

Regarding Claims 14 and 16-27, the Examiner states that "[r]egarding, the selection of a subset of products, Hartman et al. teach product subsets being determined by 'experienced retailers' who have a 'good feel for the price sensitivity of items' in a product line ('425, column 5, lines 48-64)." Moreover, the Examiner stated that "it would have been obvious to one of the ordinary skill to automate the subset selection of Hartman et al. using a well known computer algorithm such as integer programming."

Appellants respectfully disagree with the Examiner's findings. The subset generation of the present invention includes "designating a subset of products of the plurality of products, wherein the number of products in the subset of products is less than the number of products in the plurality of products, the designating a subset of products comprising: **generating a set of candidate products** of the plurality of products; **designating a number N; determining which N products of the candidate products have the largest impact** on optimization of prices **by solving an integer problem;** and **selecting no more than N products** of the plurality of products to form the subset of products using **the determination of which N products have the largest impact on optimization**." (Emphasis Added). The motivation for generating subsets is to reduce the number of products optimized for, and reduce costs associated with updating many

products' prices. The method of generating the subset utilizes an integer problem of contribution to a business goal. The selection of the subset is performed internally by the system.

Contrary, in Hartman et al., products are pooled for the motivation of applying different prices to each pool. (Column 2, lines 64-66). The method of pooling involves the dealer grouping products by what he "feels" a customer's sensitivity is to the product. (Column 2, lines 60-63). The selection of pools is performed by a user outside of the system, and the system "receives" these pools for product pricing. (See Claims 1, 3, 9 and 16).

As such, Appellants believe that the present invention's claimed method of subset generation is very different than an "experienced retailer" selecting products based on a 'hunch' as to customer sensitivity. Hartman et al. does not teach, suggest, imply, or even contemplate the sophisticated system of subset designation by marginal contribution to a business goal as disclosed in the present invention.

As such, Claims 14 and 21-24 are believed allowable over the cited art. Dependent claims 16-20 and 25-27, as depending from an allowable parent claim, are also allowable for at least the same reasons.

ii.   **Hartman et al. Fails to Suggest Subset Optimization**

Regarding Claims 14 and 16-27, even if one were to find that Hartman et al. discloses "subset generation" as claimed, Appellants assert that Hartman et al. does not disclose, teach or suggest the "optimizing prices for products in the subset of products using the demand model, while maintaining the initial prices of products of the plurality of products that are not in the subset of products" as claimed.

All of the products in Hartman et al. are pooled. (Column 4, lines 35-44). Each pool is then used to set the pricing of the product within that pool. (Column 6, lines 14-23). As such, all products in Hartman et al. are selected for price setting.

The present invention **only optimizes for the products populating the singular subset while maintaining all other prices**. As such, Hartman et al. does not optimize for the subset as disclosed by the present invention.

Moreover, Hartman et al. does not disclose optimization of prices at all. The method of Hartman et al. utilizes variable pricing theory which is incompatible with optimization theory. (Column 4, lines 41-43; Column 6, lines 14-24). Thus, for at least this reason, Hartman et al. does not optimize for the subset as disclosed by the present invention.

As such, Claims 14 and 21-24 are believed allowable over the cited art. Dependent claims 16-20 and 25-27, as depending from an allowable parent claim, are also allowable for at least the same reasons.

iii. Ouimet et al. Fails to Suggest Subset Optimization

Regarding Claims 14 and 16-27, even if one were to find that Hartman et al. discloses "subset generation" as claimed, and further, even if one were to believe that Ouimet et al. and Hartman et al. are combinable despite their gross incompatibilities, Appellants assert that Ouimet et al. does not disclose, teach or suggest the "optimizing prices for products in the subset of products using the demand model, while maintaining the initial prices of products of the plurality of products that are not in the subset of products" as claimed.

Even if all of the examiner's statement were true, Hartman et al. would produce groupings of products and Ouimet et al. would optimize the prices for these groupings. Even so, this combination would not produce a system where the prices are maintained for the products not within the subset. This is because both Ouimet et al. and Hartman et al. describe setting prices for all their products. Neither Ouimet et al. nor Hartman et al. hint, teach or suggest setting prices for a portion of the products. As such, even in the unlikely situation where these prior arts are combined as the examiner desires, there is still no disclosure of the claimed invention.

As such, Claims 14 and 21-24 are believed allowable over the cited art. Dependent Claims 16-20 and 25-27, as depending from an allowable parent claim, are also allowable for at least the same reasons.

D. CONCLUSION

In sum, Appellants believe that all pending Claims 1, 3-7, 9-14 and 16-28 are allowable over the cited art and are also in allowable form and respectfully request a Notice of Allowance for this application from the Appeal Board. The commissioner is authorized to charge any fees that may be due to our Deposit Account No. 50-2766 (Order No. DEM1P008). Should the Appeal Board believe that a telephone conference would expedite the prosecution of this appeal; the undersigned can be reached at telephone number 925-570-8198.

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Respectfully submitted,

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VIII. LISTING OF CLAIMS APPENDIX:

What is claimed is:

1.   An apparatus for implementing a preferred set of prices for a subset of a plurality of products, comprising computer readable media, comprising:

        a database configured to store initial prices for a plurality of products;

        a modeling engine configured to create a demand model for the plurality of products based on Bayesian modeling;

        a subset generator configured to designate a subset of products of the plurality of products, wherein the number of products in the subset of products is less than the number of products in the plurality of products, the subset being designated by solving an integer problem, and wherein the subset generator is also configured to enable a number N to be designated and the subset generator is also configured to select no more than N products of the plurality of products to form the subset of products, and wherein the selected no more than N products has the largest impact on optimization of prices of any subset of no more than N products of the plurality of products;

        an optimizer configured to optimize prices for products in the subset of products, using the created demand model, while maintaining the initial prices of products of the plurality of products that are not in the subset of products, wherein the optimization includes relaxation of constraints; and

        an interface configured to report the optimized prices of the subset of products for price setting, wherein the price setting establishes the amount of money consumers pay for each product of the subset of product.

2.   (Cancelled)

3.   The apparatus, as recited in claim 1, wherein the subset generator configured to select no more than N products selects products that have had a change in information state, and products of the plurality of products that have constraints enabling price movement.

4.   The apparatus, as recited in claim 3, further comprising computer readable code for providing initial prices by optimizing prices for all of the plurality of products.

5.   The apparatus, as recited in claim 4, further comprising computer readable code for providing new data subsequent to providing initial prices by optimizing prices.

6.   The apparatus, as recited in claim 5, wherein the computer readable code for providing new data comprises computer readable code for providing new price data and computer readable code for providing new bound data.

7.   The apparatus, as recited in claim 6, further comprising computer readable code for providing rule relaxation, wherein the computer readable code for providing rule relaxation comprises:

            computer readable code for allowing the prioritization of a plurality of rules; and
            computer readable code for relaxing at least one lower priority rule to allow a
    higher priority rule to become feasible.

8.   (Cancelled)

9.   The apparatus, as recited in claim 1, further comprising computer readable code for providing initial prices by optimizing prices for all of the plurality of products.

10.   The apparatus, as recited in claim 1, further comprising computer readable code for providing new data subsequent to providing initial prices by optimizing prices.

11.   The apparatus, as recited in claim 10, wherein the computer readable code for providing new data comprises computer readable code for providing new price data and computer readable code for providing new bound data.

12.   The apparatus, as recited in claim 1, further comprising computer readable code for providing rule relaxation.

13.   The apparatus, as recited in claim 12, wherein the computer readable code for providing rule relaxation, comprises:

        computer readable code for allowing the prioritization of a plurality of rules; and

        computer readable code for relaxing at least one lower priority rule to allow a higher priority rule to become feasible.

14.   A computer-implemented method for computing a preferred set of prices for a subset of products of a plurality of products, comprising:

        storing initial prices for a plurality of products;

        creating a demand model based on Bayesian modeling;

        designating a subset of products of the plurality of products, wherein the number of products in the subset of products is less than the number of products in the plurality of products, the designating a subset of products comprising:

        generating a set of candidate products of the plurality of products;

        designating a number N;

        determining which N products of the candidate products have the largest impact on optimization of prices by solving an integer problem; and

        selecting no more than N products of the plurality of products to form the subset of products using the determination of which N products have the largest impact on optimization;

            optimizing prices for products in the subset of products using the demand model, while maintaining the initial prices of products of the plurality of products that are not in the subset of products using the demand model, wherein the optimization includes a relaxation of constraints; and

            reporting the optimized prices of the subset of products for price setting, wherein the price setting establishes the amount of money consumers pay for each product of the subset of product.

15.   (Cancelled)

16.   The method, as recited in claim 14, wherein the selecting no more than N products selects products that have had a change in information state, and products of the plurality of products that have constraints enabling price movement.

17.   The method, as recited in claim 14, further comprising providing initial prices by optimizing prices for all of the plurality of products.

18.   The method, as recited in claim 17, further comprising providing new data subsequent to providing initial prices by optimizing prices.

19.   The method, as recited in claim 18, wherein the new data comprises new price data and bound data.

20.   The method, as recited in claim 14, further comprising providing rule relaxation, wherein the rule relaxation comprises:
    prioritizing a plurality of rules; and
    relaxing at least one lower priority rule to allow a higher priority rule to become feasible.

21.   A computer-implemented method for setting prices for a subset of products of a plurality
of products, comprising:

   receiving optimized prices for a product category;

   pricing every item in the product category according to the received optimized
prices;

   providing new data;

   receiving new prices for the subset of products of the product category, wherein
the subset is smaller than the product category, wherein the received new prices are
generated by storing initial prices for a plurality of products, designating a subset of
products of the plurality of products, wherein the number of products in the subset of
products is less than the number of products in the plurality of products, the subset being
designated by solving an integer problem, and wherein the designation of the subset of
products includes allowing a number N to be designated and selecting no more than N
products of the plurality of products to form the subset of products, and wherein the
selected no more than N products has the largest impact on optimization of prices of any
subset of no more than N products of the plurality of products;

   optimizing prices for products in the subset of products, while freezing the initial
prices of products of the plurality of products in the product category that are not in the
subset of products, wherein the optimization includes relaxation of constraints; and

   setting prices for the subset of products according to the received new prices,
wherein the price setting establishes the amount of money consumers pay for each
product of the subset of product.

22. A computer-implemented data signal embodied in a carrier wave and representing sequences of instructions which when executed by a processor, causes the processor to compute a preferred set of prices for a subset of a plurality of products, by performing the steps comprising:

storing initial prices for a plurality of products;

designating a subset of products of the plurality of products, wherein the number of products in the subset of products is less than the number of products in the plurality of products, the subset being designated by solving an integer problem, and wherein the designation of the subset of products includes allowing a number N to be designated and selecting no more than N products of the plurality of products to form the subset of products, and wherein the selected no more than N products has the largest impact on optimization of prices of any subset of no more than N products of the plurality of products;

optimizing prices for products in the subset of products, while maintaining the initial prices of products of the plurality of products that are not in the subset of products, wherein the optimization includes relaxation of constraints;

displaying optimized prices for products in the subset of products; and

setting store prices for products in the subset of products to optimized prices for products in the subset of products.

23. A computer-implemented price database generated by the method comprising:

storing initial prices for a plurality of products;

designating a subset of products of the plurality of products, wherein the number of products in the subset of products is less than the number of products in the plurality of products, the subset being designated by solving an integer problem, and wherein the designation of the subset of products includes allowing a number N to be designated and selecting no more than N products of the plurality of products to form the subset of products, and wherein the selected no more than N products has the largest impact on

optimization of prices of any subset of no more than N products of the plurality of products;

optimizing prices for products in the subset of products, while maintaining the initial prices of products of the plurality of products that are not in the subset of products, wherein the optimization includes relaxation of constraints; and

reporting the optimized prices of the subset of products for price setting, wherein the price setting establishes the amount of money consumers pay for each product of the subset of product.

24.　　A computer-implemented method for obtaining optimized price data on a client system, comprising the steps of:

sending sales data to a server system for a plurality of products;

selecting optimization preferences;

transmitting said optimization preferences to said server system;

receiving from said server system optimization prices for all of the plurality of products, wherein the optimization includes relaxation of constraints;

sending additional sales data to the server system;

selecting a subset constraint;

sending the subset constraint to the server system;

receiving from the server system a new set of optimization prices for a subset of the plurality of products which is less than the plurality of products, the subset being designated by solving an integer problem, wherein the optimization includes relaxation of constraints, and wherein the designation of the subset of products includes allowing a number N to be designated and selecting no more than N products of the plurality of products to form the subset of products, and wherein the selected no more than N products has the largest impact on optimization of prices of any subset of no more than N products of the plurality of products; and

setting prices for the subset of products according to the received new prices, wherein the price setting establishes the amount of money consumers pay for each product of the subset of product.

25.   The method, as recited in claim 14, wherein the integer problem is based on an objective function which includes a sum of a plurality of marginal product price values.

26.   The apparatus, as recited in claim 1, further comprising computer readable code for resolving errors of new data provided, utilizing a grid of time periods including records, comprising:

computer readable code for removing duplicate records of the new data;

computer readable code for removing the records for discontinued products, wherein the plurality of products includes discontinued products;

computer readable code for removing the records that include at least one of negative prices, negative sale volume, negative costs, and erroneous prices, wherein the erroneous prices includes a product price that is a specified configurable standard deviations from mean price of the product of the plurality of products;

computer readable code for removing the new data from closed stores, wherein the closed stores are determined by a lack of product movement at the closed store for a set time period;

computer readable code for removing missing records, of the records, in the grid of time periods' first and last row; and

computer readable code for generating replacement records for missing records, of the records, in the grid of time periods.

27.   The method, as recited in claim 14, further comprising resolving errors of new data provided, utilizing a grid of time periods including records, comprising:

        removing duplicate records of the new data;

        removing the records for discontinued products, wherein the plurality of products includes discontinued products;

        removing the records that include at least one of negative prices, negative sale volume, negative costs, and erroneous prices, wherein the erroneous prices includes a product price that is a specified configurable standard deviations from mean price of the product of the plurality of products;

        removing the new data from closed stores, wherein the closed stores are determined by a lack of product movement at the closed store for a set time period;

        removing missing records, of the records, in the grid of time periods' first and last row; and

        generating replacement records for missing records, of the records, in the grid of time periods.

28.   The apparatus, as recited in claim 1, wherein the largest impact on optimization of prices maximizes an objective factor, wherein the objective factor includes at least one of maximizing profits, and maximizing sales of a product of the plurality of products.

IX.   EVIDENCE APPENDIX

X.   RELATED PROCEEDINGS APPENDIX